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ADDENDUM #1 TO THE MINUTES OF THE 2nd RELIABLE REPLACEMENT WARHEAD PROJECT OFFICERS GROUP MEETING Dated 9 Jun 05 (U)

LANL DESIGN OPTIONS

A-05-243(R)

9 June 2005

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
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2nd REVIEW-DATE: 1-22-07	
AUTHORITY: DD NAME: Eric Ziger	

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Addendum #1 To The 2nd Reliable Replacement Warhead Project Officers Group Meeting (U)
LANL Design Options (U)
Sandia National Laboratories, Albuquerque, NM

9 June 2005

(U) This document contains the limited distribution LANL Proprietary Design Options Review presentations from the 2nd Reliable Replacement Warhead Project Officers Group Meeting.

(U) The List of Attendees for this LANL Proprietary breakout session is on the following page.

(U) LIST OF APPENDICES

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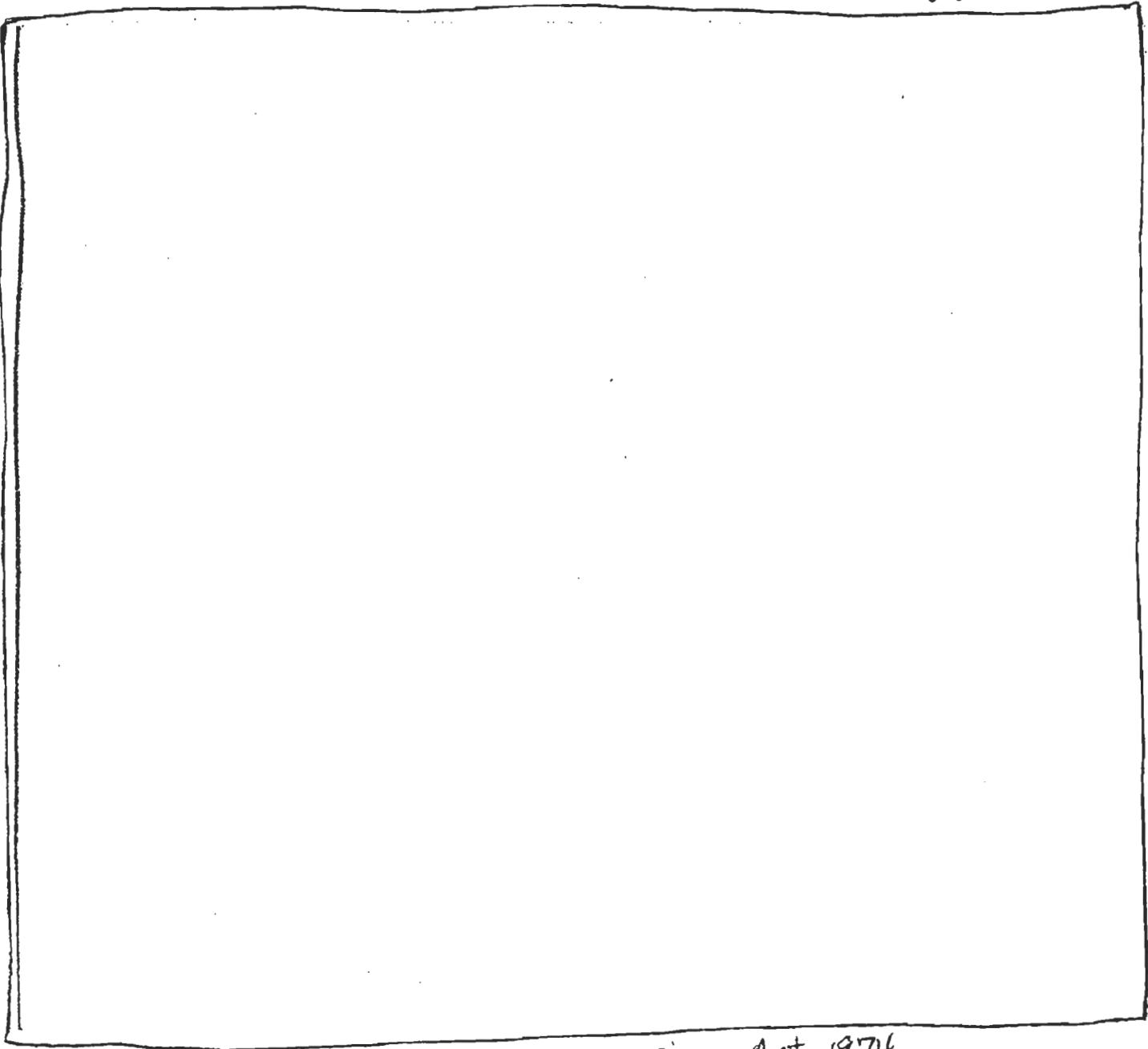
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Addendum #1 To The 2nd Reliable Replacement Warhead Project Officers Group Meeting (U)
LANL Design Options (U)
Sandia National Laboratories, Albuquerque, NM

(U) List of Attendees for the LANL Design Options Meeting

9 June 2005

Exemption (b)(6)



privacy Act 1974

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APPENDIX N

LANL PRIMARY DESIGN & CERTIFICATION (U)



Exemption 6
(b)(6)
Privacy Act 1974

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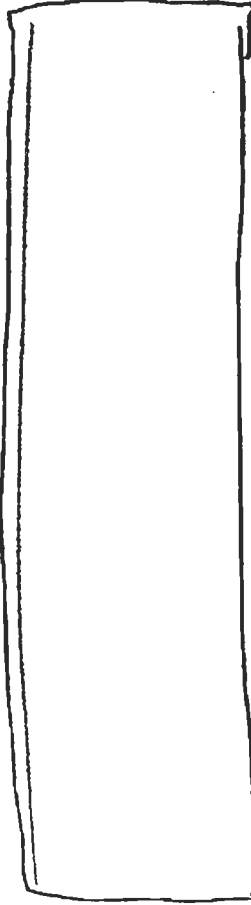
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PRIMARY DESIGN AND CERTIFICATION (WITHOUT NUCLEAR TESTING) (U)

RRW JPOG

June 9, 2005

Exemption
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Derivative Classifier:
David Hecker, X-4
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RRW Meets Requirements for the Future Nuclear Deterrent

RRW must be credibly certified w/o nuclear testing

- Design technology and space selected for certification

1.4 (a)(e)

- Use gates and QMU for certification

RRW must reduce costs

- Infrastructure costs (factories)
- Manufacturing costs (personnel and processes)
- Maintenance costs (field level repair and rebuild)

RRW must be mission flexible

- Multiple missions and delivery platforms

Sec 6.2
RO

RRW must be used to train new nuclear staff

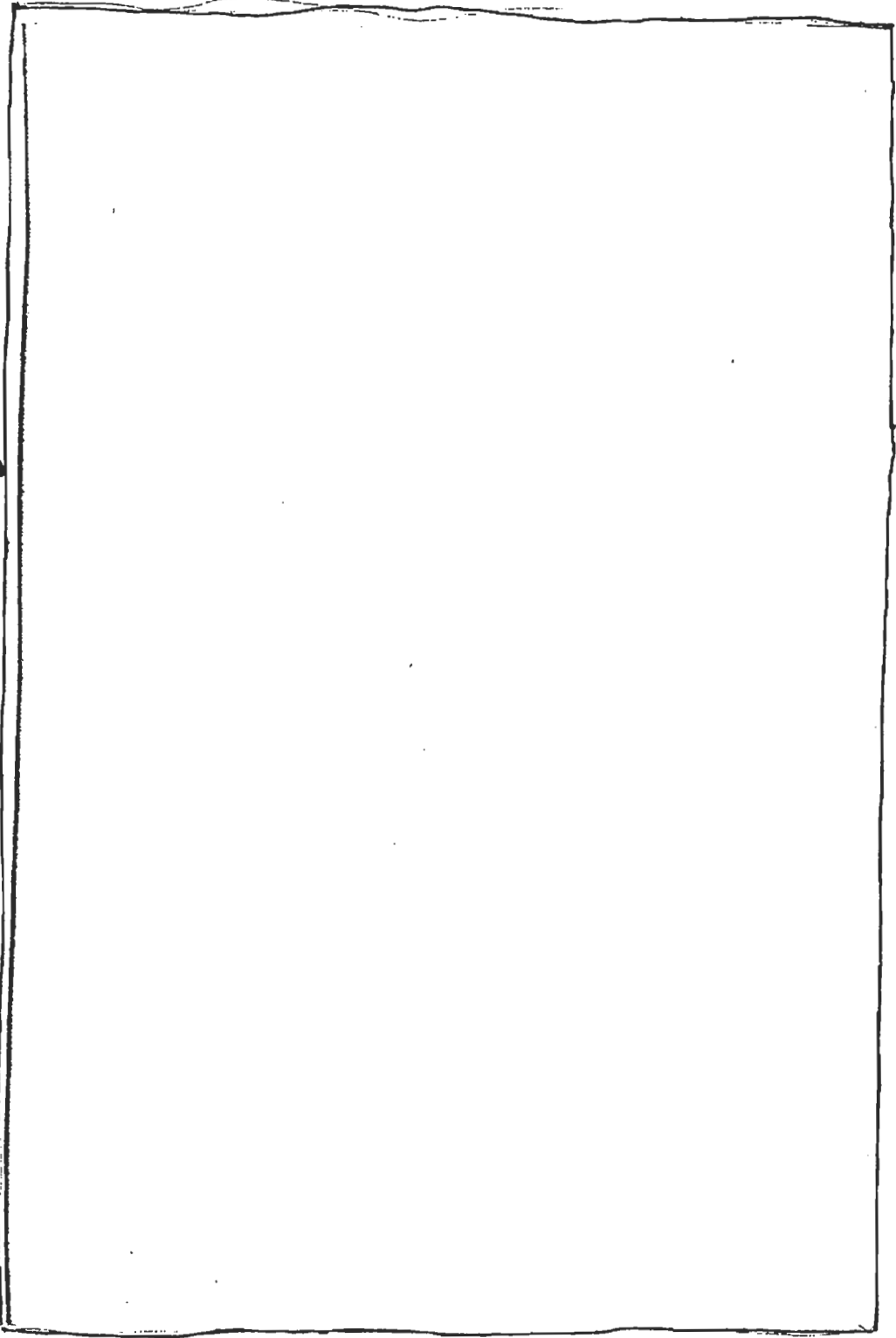
- Judgment is lacking in inexperienced staff

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3

Design Space is Essentially Unlimited

Sec 6.2
RD



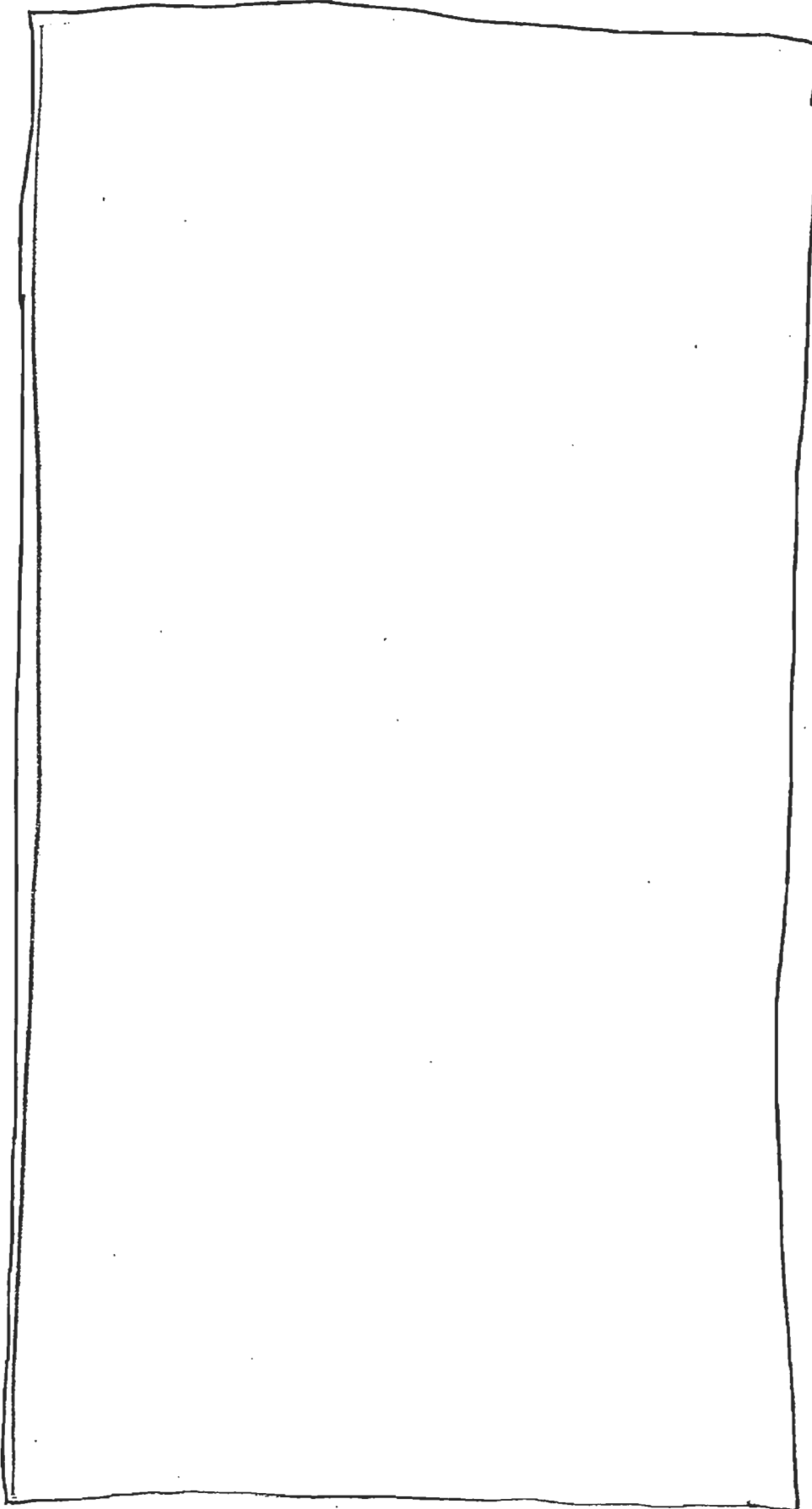
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LANL RRRW Design Derivation



1.4(a)(e)

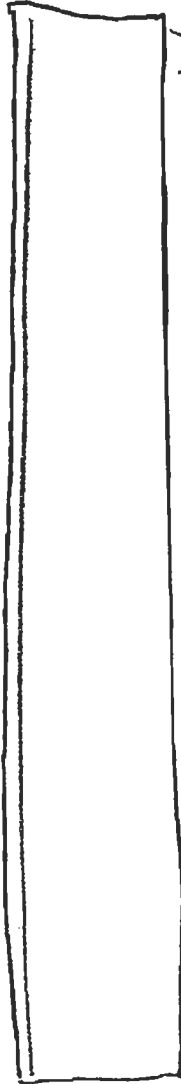
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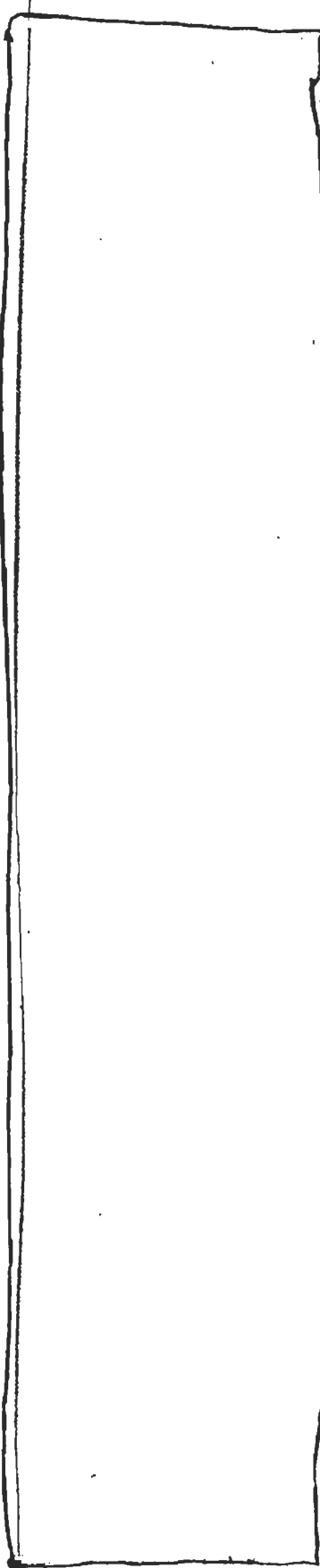
LANL RRW Design Derivation

Technology selection for certification

- Lack of nuclear RRW testing limits technology choices



1.4 (a)(e)(g)



1.4 (a)(e)(g)

Pedigree

- LANL design by NTS experienced designers with a proven record

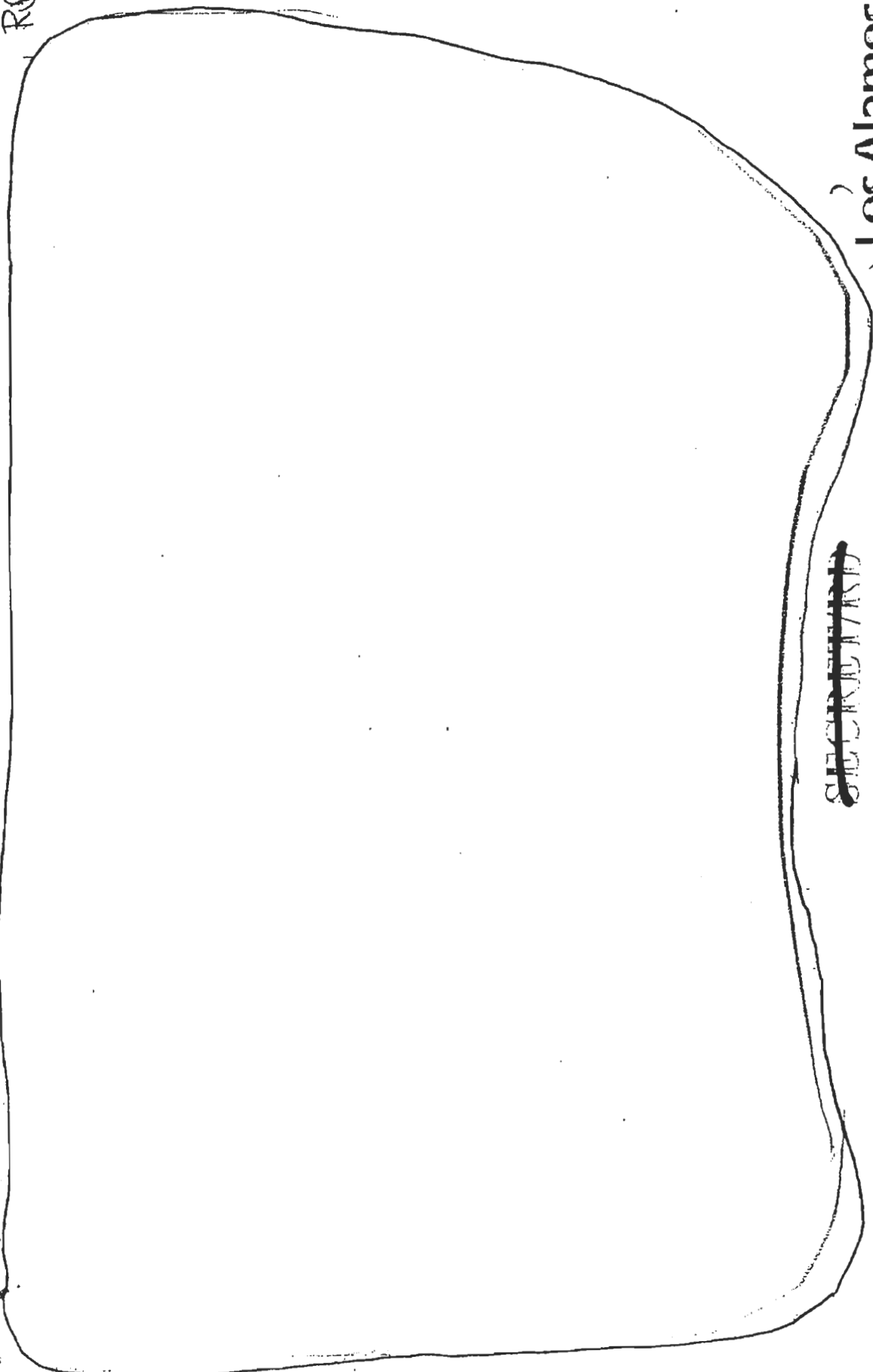
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Sec 6.2 RD

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Lesson on Alpha and Yield

Doc 76 (3)



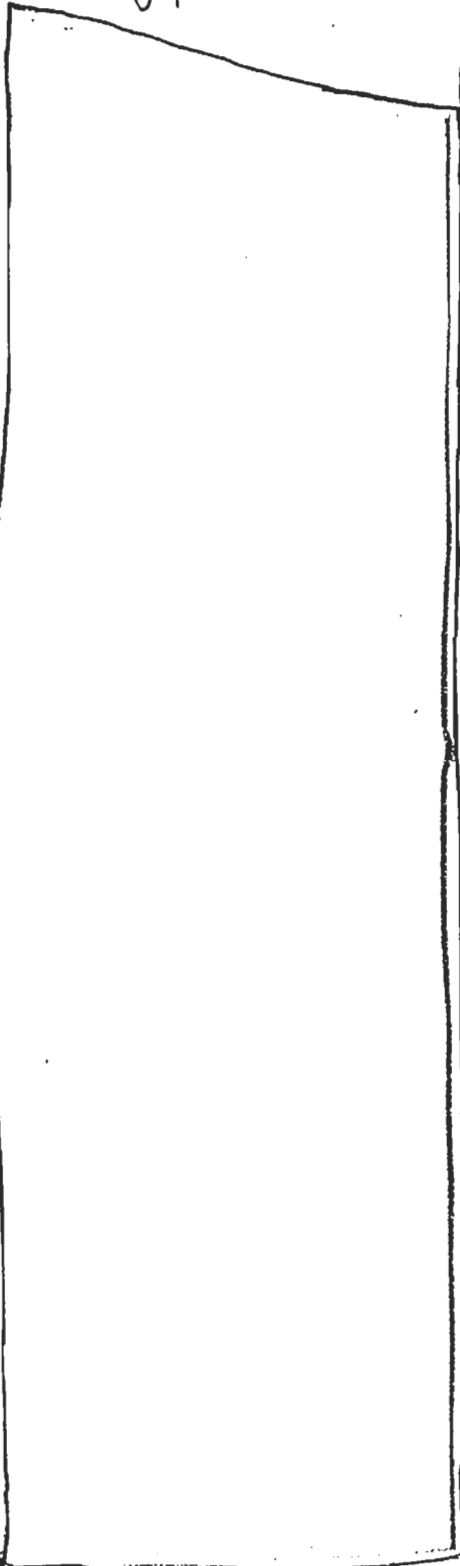
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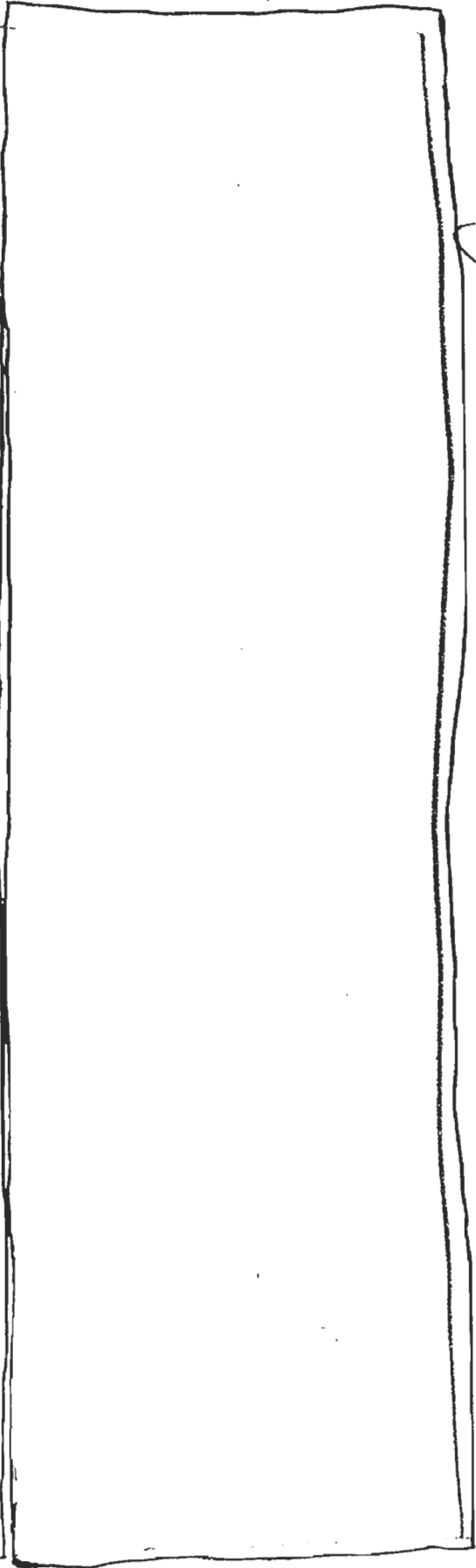
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NUCLEAR TEST LESSONS SUMMARY

DOE (2)



Sec 6.2
RD



1.4(a)(e)(g)

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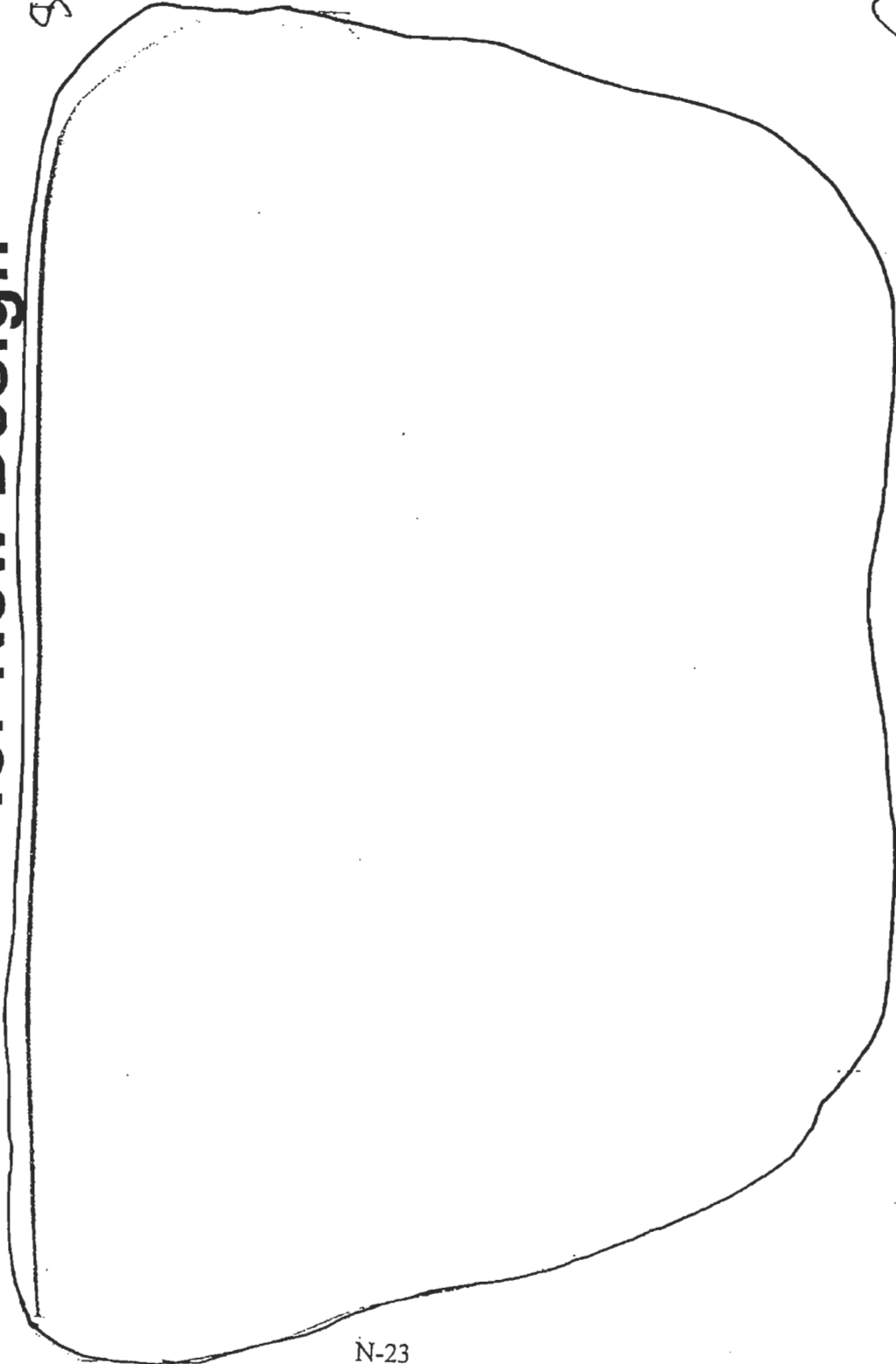
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Calculations are Insufficient for New Design

DOE
b(3)

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RD



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CALCULATION SUMMARY

□ Computer models can be inferior to physics models

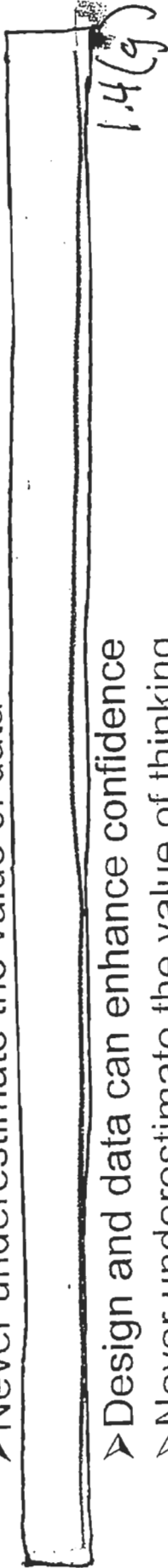
- B54 test history fit better by simple physics models
- Never underestimate the value of insight



- Never overestimate the value of calculations

□ NTS data + primitive computers are superior to modern computers alone

- Never underestimate the value of data
- Design and data can enhance confidence
- Never underestimate the value of thinking



LANL RRW Design Derivation

Technology selection for certification

[Redacted] 1.4(g)

[Redacted] 1.4(g)

Limits to computer simulations

➤ Without experienced designer judgment, calculations are questionable

Design for certification without nuclear testing

[Redacted] 1.4(g)

Pedigree

➤ LANL design by NTS experienced designers with a proven record

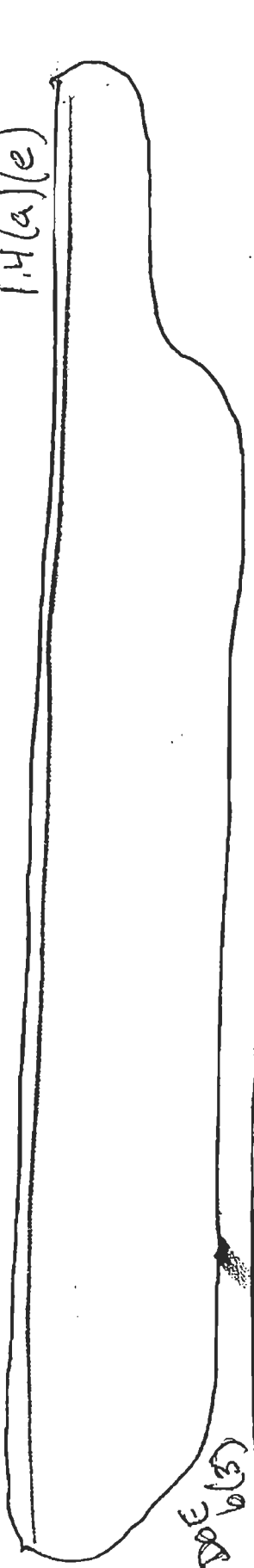
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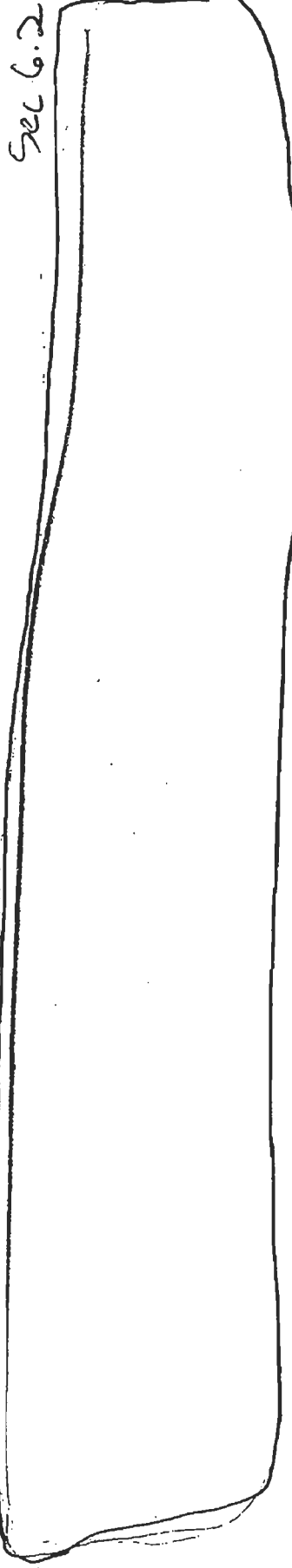
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Non-Nuclear Experiments can be used with Gates/QMU

1.4(a)(e)



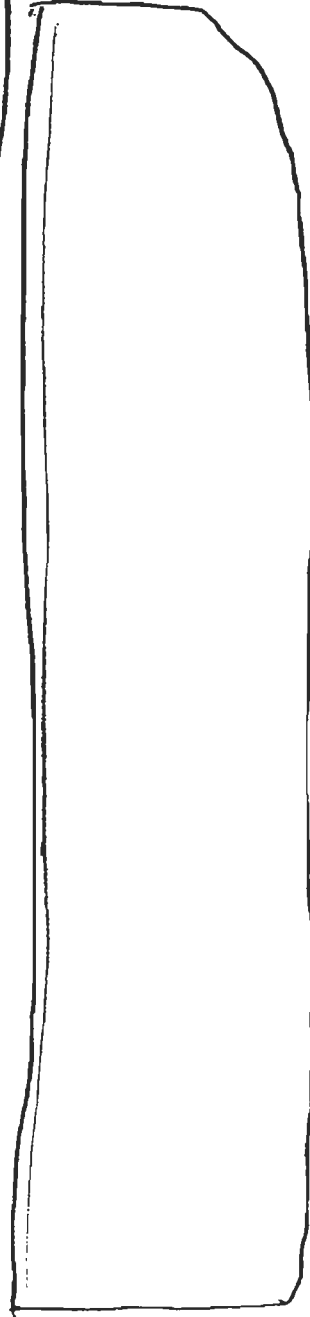
(S) 9
DOE (S)



Sec 6.2

N-34

1.4(a)(e)



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Certification by Era

□ **Classical era (real kt at NTS)**

- 1945 to 1992
- Scientific method
- Highly optimized designs win cold war

□ **Transitional era (derivative kt)**

- 1992 to 2007
- Perturbation calculations from specific events
- SLEPS maintain deterrence but are expensive

□ **Future era (calculated kt)**

- Begin 2007
- Much improved simulations, maybe predictive
- General tie to NTS data base, not specific shots
- Advanced diagnostics for legacy and RRW weapons
- Designs optimized for 21st century appear

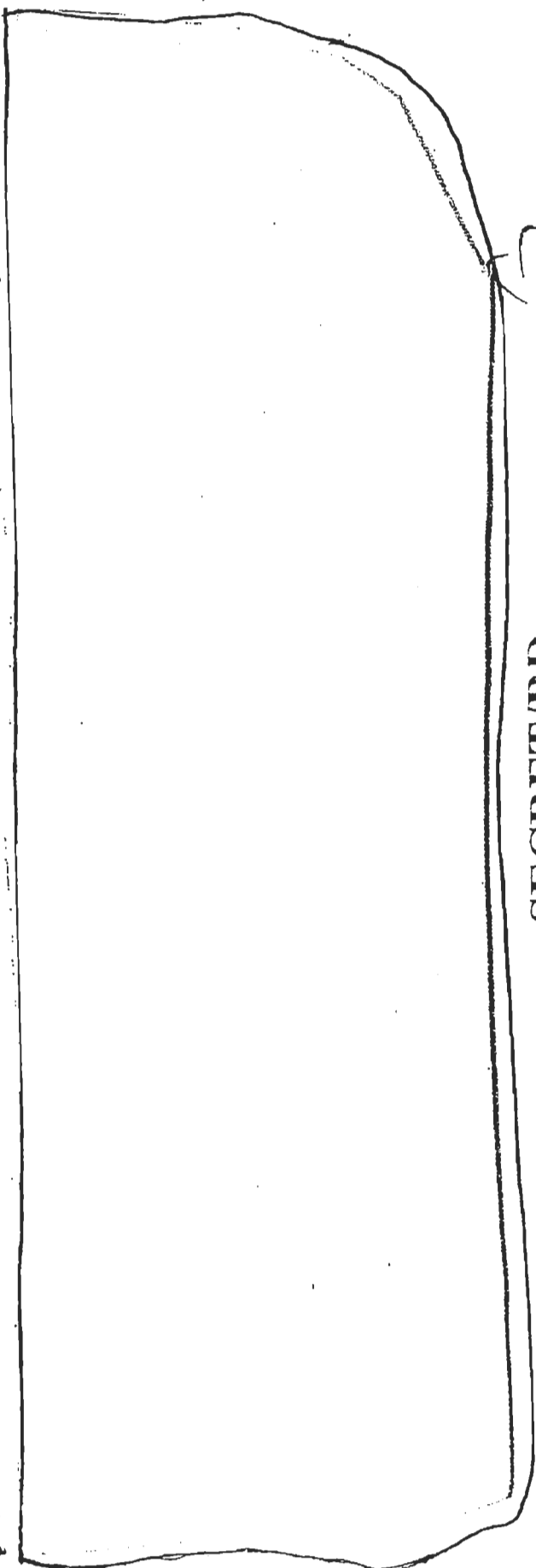
RRW DESIGN SUMMARY

(Design choices and statistics lead to certifiable weapon)

- **Historical precedent guides RRW design**
 - Technology selection for success without testing
 - Lessons from NTS show limits to judgment and calculations
- **Eliminate known problems through design**
 - Leave the margin for unknown unknowns

DRG

Sec 6.2 RD



N-38

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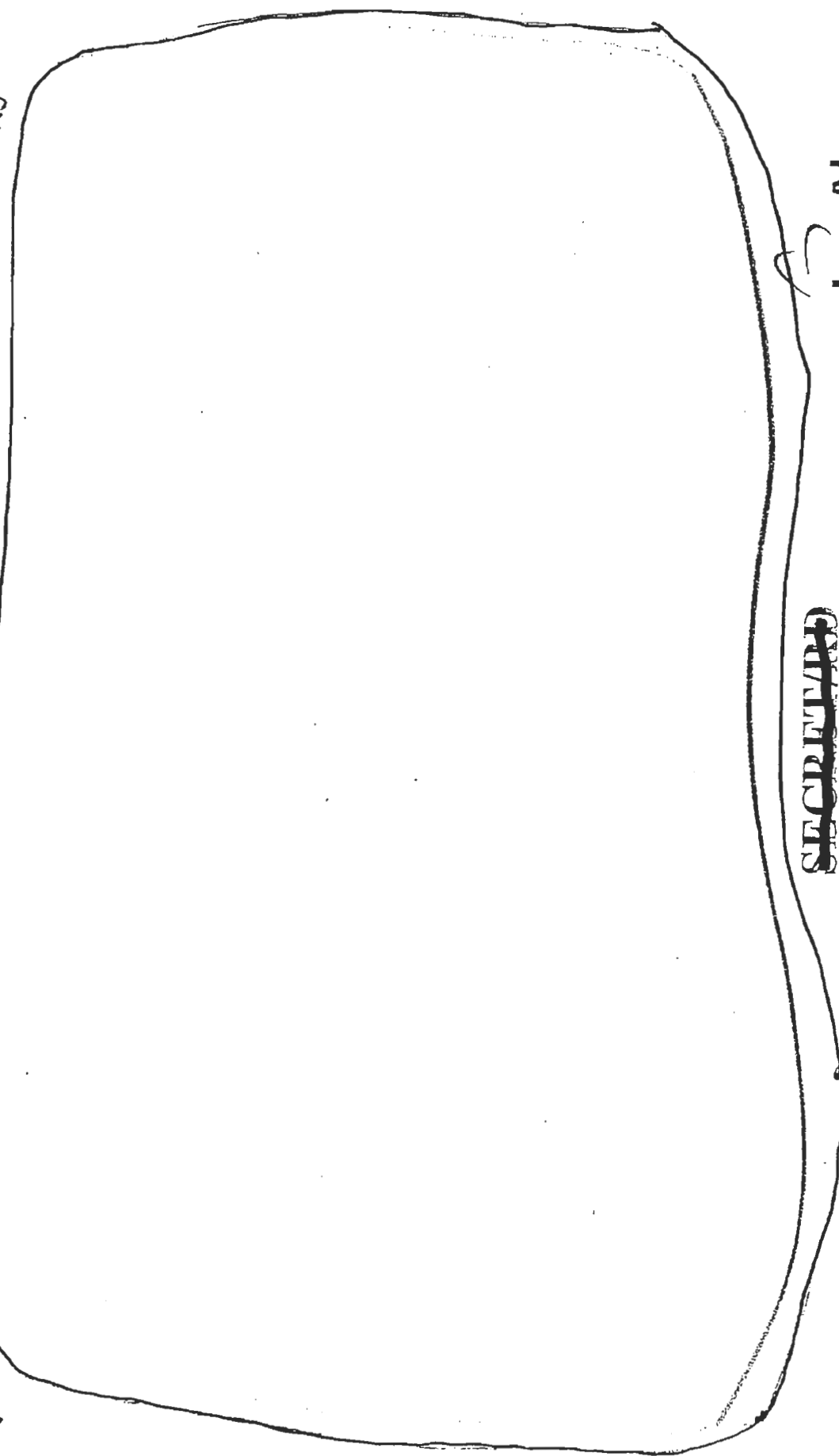
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LANL has Long History with SLBM

(Design Continuity for Excellence)

G.2 RD

Doc
6/3/79



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DESIGN PEDIGREE SUMMARY

LANL has successfully met SLBM requirements

- 30 year history of successful support

LANL designs to SLBM specifications

- Not recycled concepts adapted to SLBM use

LANL innovations to meet SLBM needs

- Stockpiled systems were developed, stockpiled, and maintained

[Redacted]

6.2 RD

- RRRW is SWPP

Design team continuity for the future

- Overlap of designers ensures excellence
- Designers of the future trained on the systems they will maintain

LANL RRW DESIGN CONCLUSION

DoE b(3)

6.2 RD

[Redacted]

1.4 (c)(9)

[Redacted]

➤ Keep it simple with respect to options we cannot test

Limits to computer simulations

➤ Judgment and insight are prerequisites to calculations

N 45

DoE b(3)

6.2 RD

[Redacted]

Pedigree

➤ LANL SLBM design by NTS experienced designers with a proven record

APPENDIX O

LANL RRW DESIGN OPTIONS (U)



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Outline

Overview of Design Options

RRW-1a Secondary Design Work

Next Steps

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